Greater China and South Asia Cellular Subscriber Sector

Product Service Preview

DCS STARTAC 90/74/70

Models (90):	S6691ABB	HONG KONG PEOPLE TELEPHONE
	S6692ABB	HONG KONG NEW WORLD
	S6693ABB	HONG KONG MANDARIN COMM
	S6694ABB	HONG KONG HUTCHISON
	S6695ABB	HONG KONG PACIFIC LINK
	S6696ABB	HONG KONG P PLUS
	S6374ABB	SINGAPORE
	S6375ABB	THAILAND (Package 1)
	S7192ABB	THAILAND (Package 2)
	S6373ABB	MALAYSIA
	S7345ABB	MALAYSIA (SIM Locked)
	S7120ABB	INDONESIA
	S7143ABB	TAIWAN
Transceiver (90):	SUG1120A	
Models (74):	S7251AAB	HONG KONG (Package 1)
	S7324AAB	HONG KONG (Package 2)
	S7252AAB	TAIWAN
Transceiver (74):	SUG1148A	
Models (70):	S7256AAB	SINGAPORE
	S7253AAB	THAILAND
	S7254AAB	INDONESIA
	S7255AAB	MALAYSIA
Transceiver (70):	SUG1144A	

Weight and Volume:
Weight with Slim battery : 125 grams
Volume = 119 cc

Description:

1.The housing and the dimension is same as GSM Startac Except the Antenna is a little shorter than the GSM Startac.
2.DCS StarTAC 90 is black in color while both 74 and 70 charcoal grey in color. Both 90 and 74 have a 4-line graphic B/W LCD display while 70 has a display like that of 8400. Only 90 has the Vibrate Alert.
3.Frequency range : RX - 1805.2 - 1879.8 MHz
TX - 1710.2 - 1784.8 MHz
4. PCB and Components layout are very similar to that on GSM Startac.
5. Same size SIM Card as GSM Startac.
6. Talk time of the Slim Battery is 100 (No DTX) , 120 (DTX) minutes.

Test Equipment :

1. HP8922H

2. HP83220E
3. 46103U: WinGate 22, order HP83220E (Option 18) and add to 46103U for phasing DCS and Dual Band radios. Existing software, v1.15.76, can phase DCS StarTAC.

Set Up :

Service Tools:

DCS Startac uses the same antenna tool , Screw Driver and the Extension Board as GSM Startac.

TA Label file: It is available.

Circuit Description :

1. Receive IF is 215 MHz
2. RX LO is 430 MHz
3. TX LO is 240 MHz (GSM Startac is 80 MHz)
4. Channel assignment :
   TX Frequency = (CH - 511)*2 + 1710
   example : Frequency of Ch 579 is (579-511)*2 + 1710 = 1723.6 MHz
   RX Frequency = TX + 95

   example : Ch 579 TX = 1723.6 , RX = TX + 95
   = 1723.6 + 95
   = 1818.6 MHz
5. Oscillator Crystal Y201 same as GSM Startac is 13 MHz

6. External Connector (Butt Plug) does not support Audio In/Out. Audio Signal will be converted for in/out via Uplink and Downlink.

* Note : The other is same as GSM Startac ,

Field Service Plan:

Distributors: Spare boards are available.

Motoroloa HTCs: L1 and L3 parts lists and schematics are available at Error! Bookmark not defined.. Please contact Error! Bookmark not defined. for any inquires.

Repairability:

Same as GSM Startac

DCS StarTac_P10

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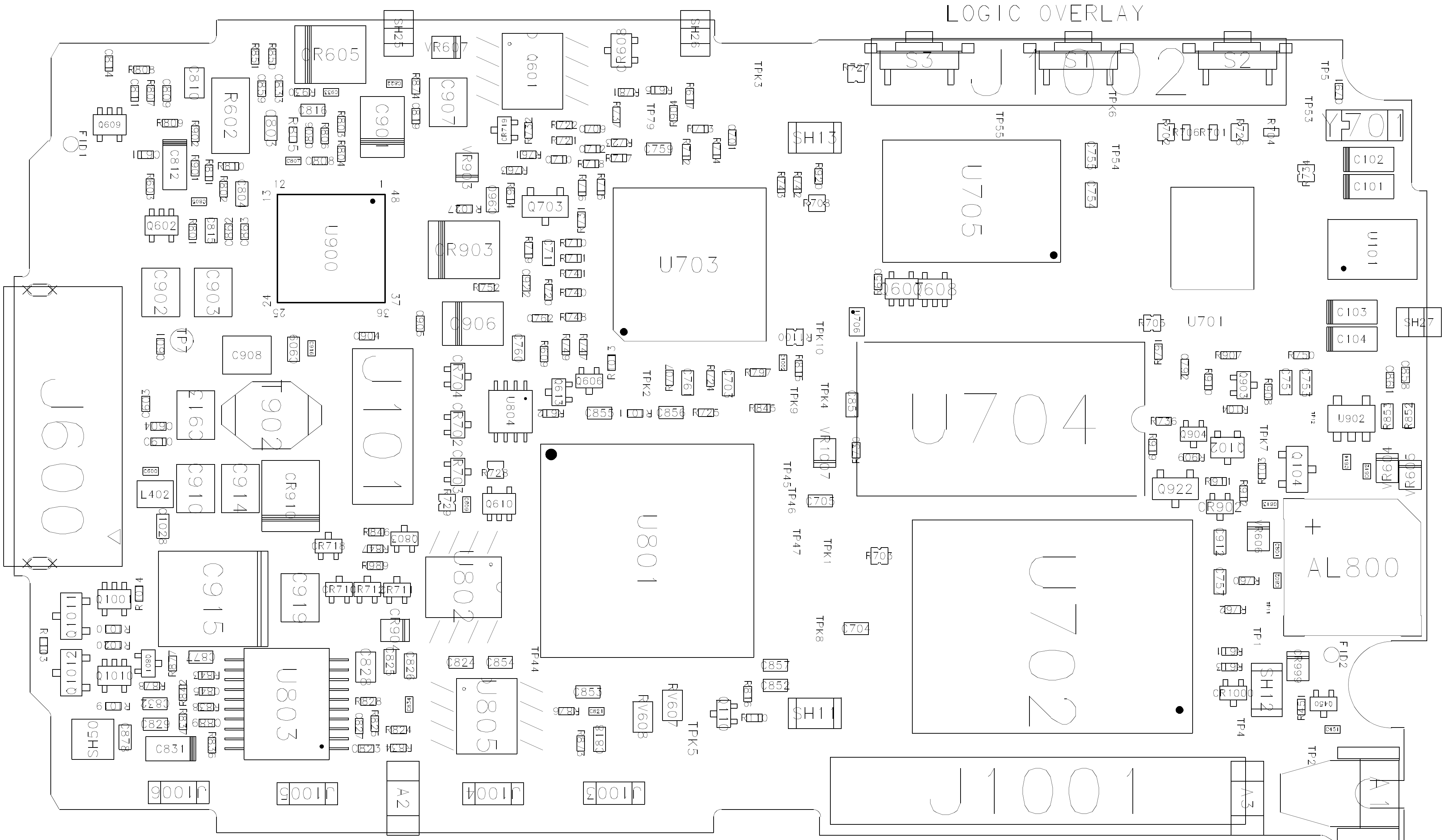

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DCS StarTac_P10

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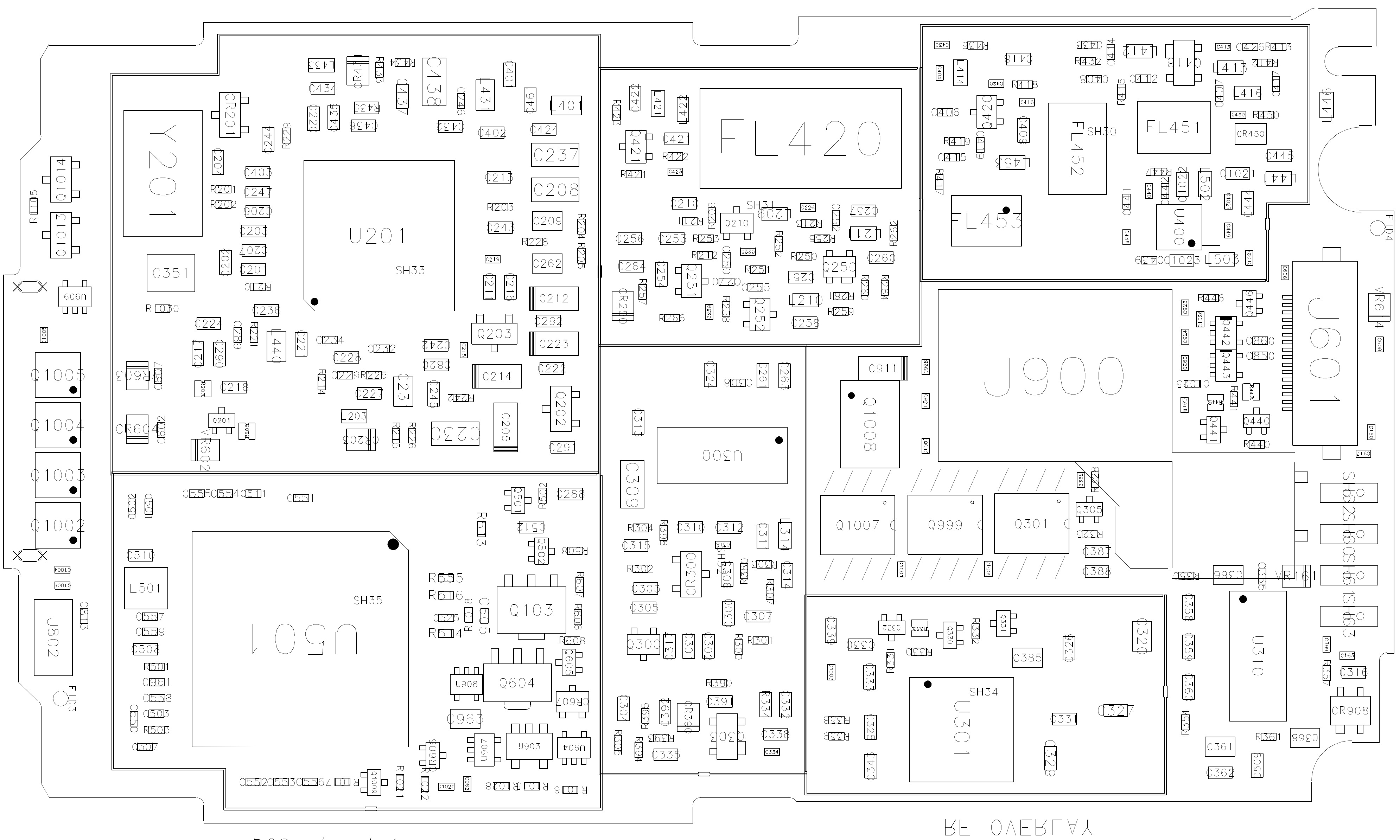

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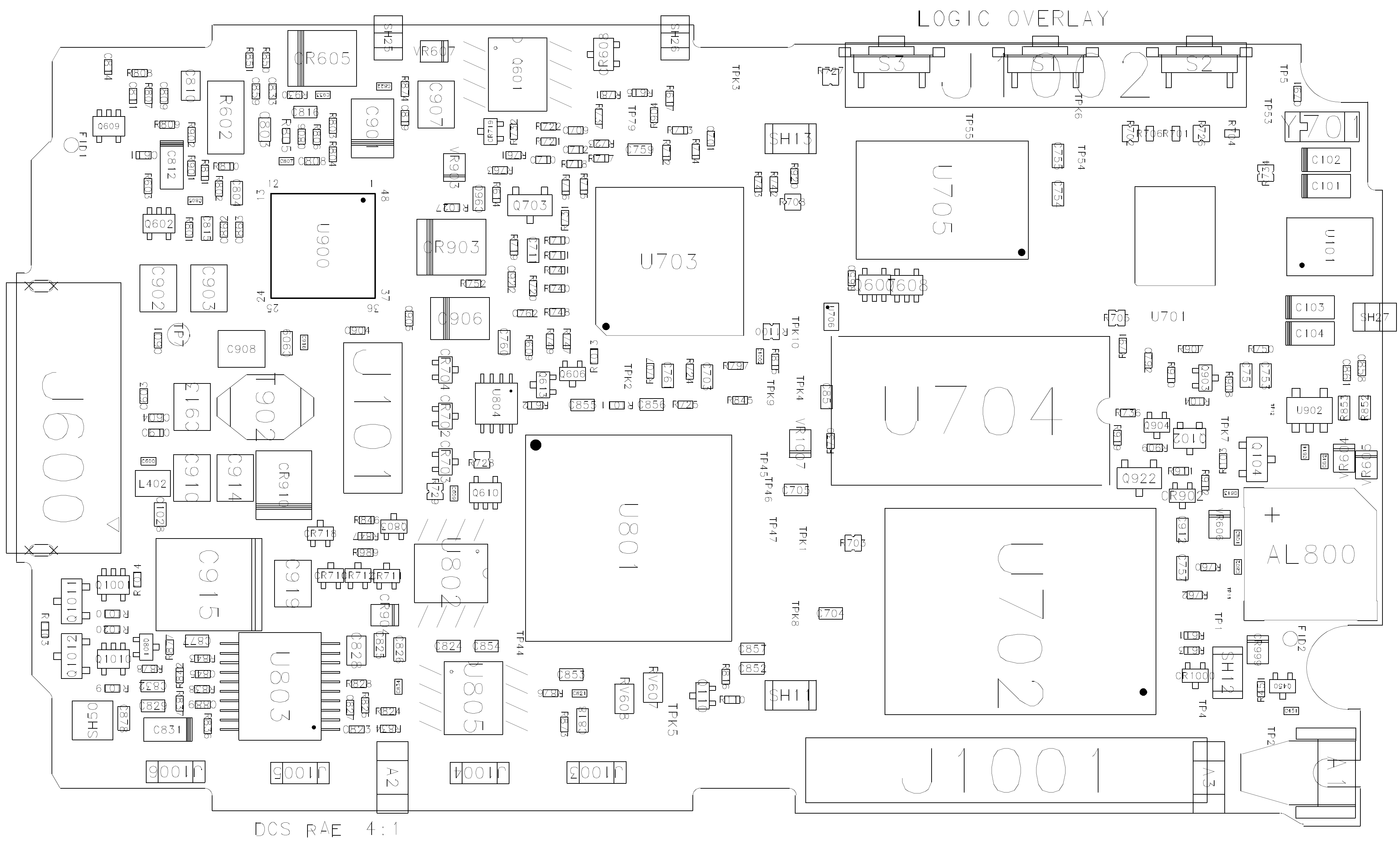
DCS StarTac_P10

Page 1



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DCS StarTac_P10

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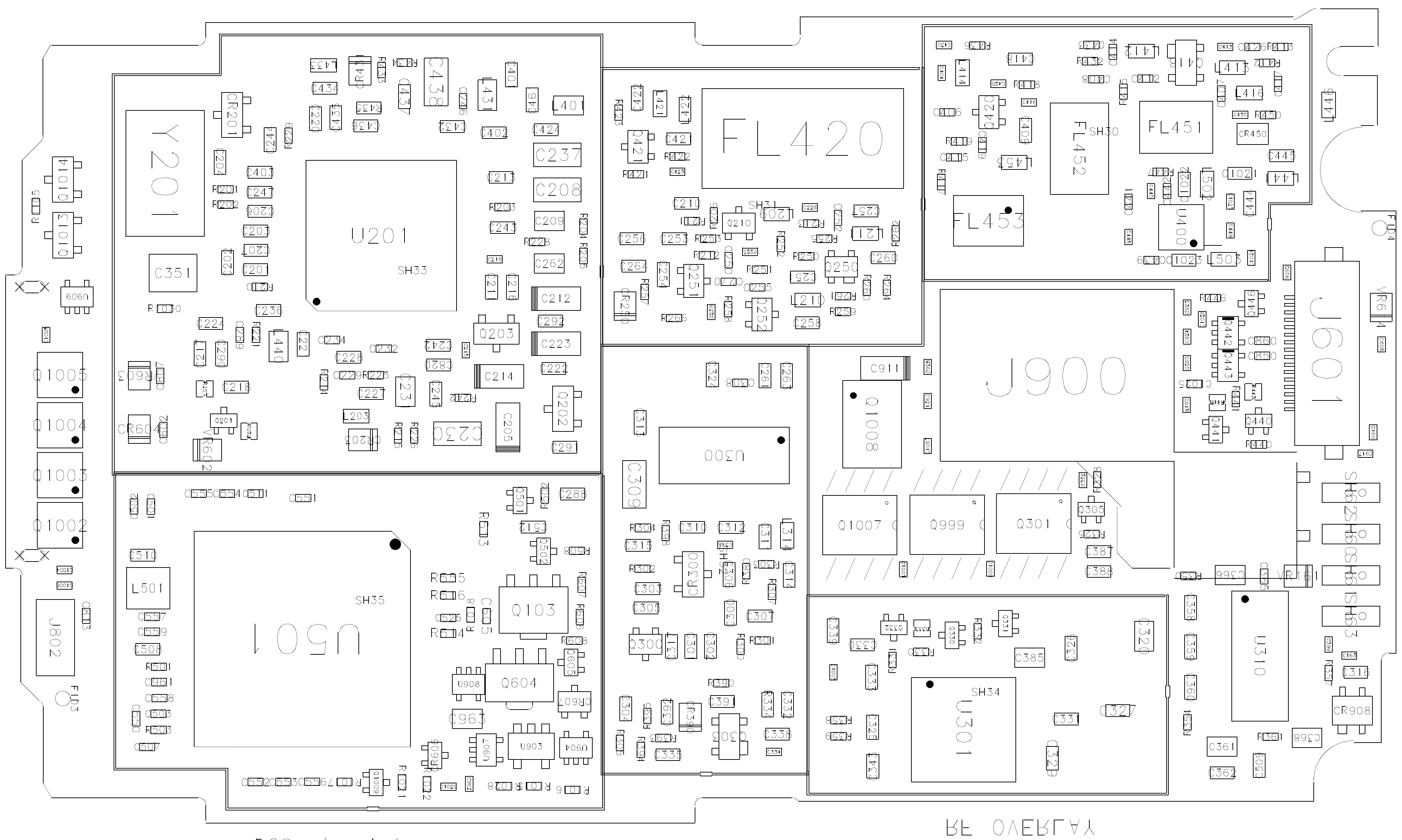

84D09336E01
DATE: 08/12/97

DCS RAE 4:1
ISSUE: 0
TIME: 5:00PM

Updated: 29th Jun 1998
Ver 1.0

DCS StarTAC

AL LAYER - ORDERABLE SPARES

Part Designa-tor	Part Description	Part Number	Part Designator	Part Description	Part Number
A2 / A3	Ground clips Ant. tube	4209480E01	T902	Choke / Vswitch	2509306J01
AL800	Alert	5009473S01	U703	IC BIC	5109743E13
CR605	Diode / Charger	4809653F03	U704	IC SRAM	5109688L09
J101	32 Pin Display Connector	2809454C02	U801	IC Speech Coder	5199285C01
J600	15 Pin Extern Connector	0909449B04	U802	IC Multiplexer	5109632D44
J601	Flip Flexprint Connector	0909059E01	U803	Codec IC	5109920D15
J802	Microphone Connector	0909195E01	U804	IC Buffer	5109522E10
J900	SIM Connector	4009169E01	U805	IC Frquency Doubler	5109781E47
MIC	Microphone	5009536H15	U900	IC GCAP	5109632D69
Q501	Transitor TX_EN	4809607E05	Y701	XTAL 32.768KHZ	4809995L05
Q601	Power Transistor Charger	4809579E17	U702	Flashed Eprom (boot sector)	5102486T01
Q602	Transistor Batt Feedback	4809939C04	S1 - S3	Volume / Mute Switch	4009060E01
R602	Resisor / Charger Sensing	0680195M64	SH25 - 27	Ground Clips	4204774Z01

RF LAYER - ORDERABLE SPARES

tor			tor		
CR201	Master Xtal Varactor	4809641F04	Q303	Tx Exciter Transistor	4809527E19
CR203	Tx Local VCO Varactor	4809641F03	Q442	Rf Switch Control Transistor	4809939C08
CR250	Main VCO Varactor	4809641F02	Q443	Rf Switch Control Transistor	4809939C08
CR300	Tx VCO Varactor	4809612F03	Shield 30	Top of Frontend / Antenna Switch	2609225D01
CR390	Transmit Diode	4809948D10	Shield 31	Top of Main VCO / FL420	2609226D01
CR431	Rx Local VCO Varactor	4809641F03	Shield 32	Top of TIC / TX VCO	2609227D01
CR908	Signal Indicator LED	4809118D01	Shield 33	Top of GIFSYN	2609228D01
FL420	IF Saw Filter	9109179E01	Shield 34	Top of PA	2609229D01
FL451	1st Rx Filter	9109068E02	Shield 35	Top of Modem	2609230D01
FL452	2nd Rx Filter	9109155K01	SH60 - 63	Clips Ext. Battery Flexprint	4209388S01
FL453	VCO Filter	9109068E01	U201	GIF SYN	5109632D92
Q202	Receive Power Transistor	4809579E18	U300	TIC	5109632D94
Q203	GIF SYN Power Transistor	4809579E18	U301	PA	5109908K31
Q300	Tx VCO Transistor	4809940E01	U310	PAC	5109632D08
Q418	Rx Amplifier Transistor	4809527E20	U401	Rf Switch	5109572E03
Q420	Rx Mixer	4809940E01	U501	Modem	5199281C03
Q421	Rx Pre-Amplifier Transistor	4809940E01	Y201	Master Xtal - 13MHz	4809277D01

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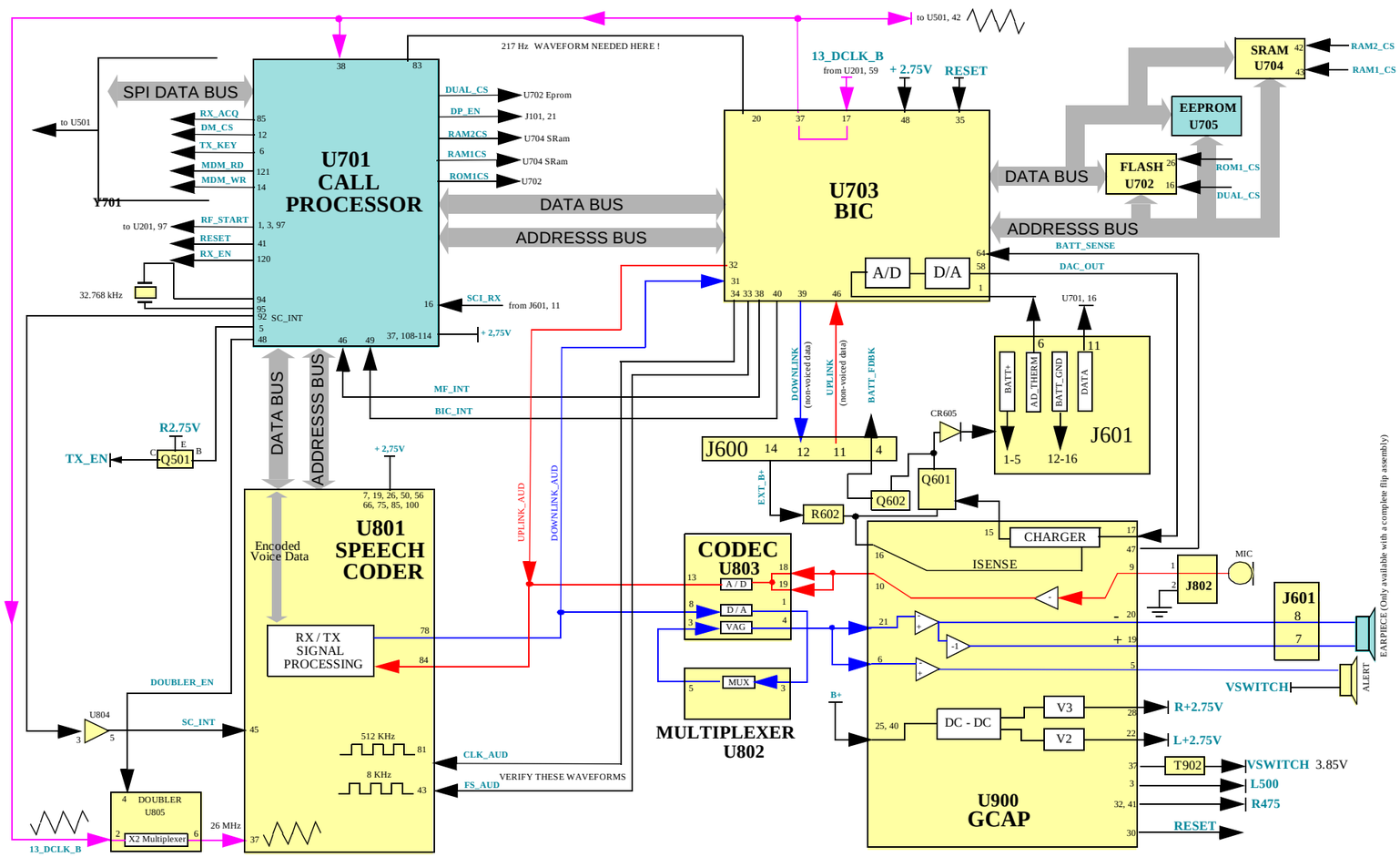
DCS StarTAC AUDIO LOGIC BLOCK DIAGRAM



LOGIC BOARD SIGNALS

Measured in standby mode

RX_EN	2.8mVpp 10ms / cm	From the CPU (U701). When high, Rx path enabled and low muted. 1. Enables the Rf switch (U400) for receive mode. 2. Biases the mixer Q420, and low noise amp (Q421).
TX_EN	7Vpp 10ms / cm	From CPU (U701), but inverted by Q501. High when 1. Enable the Rf switch for transmit mode & also the GIFSYN for transmit mode. 2. Supply Voltage for the PAC IC. 3. Isolates RF, by switching the PA Bias Circuitry (Not shown).
RESET	power on 2.8Vrms 200ms / cm	Controlled at power up by GCAP (U900) & CPU (U701). 1. Connected to CPU (U701), BIC (U703), Modem (U501) & Speech coder (U801). After power up sequence, any chip can hold RESET low to power phone off if there is a problem.
DUAL_CS	2.8Vpp 100us / cm	From CPU (U701) to Eprom. 1. Chip Enable controlling read/write access to and from Eprom (U702).
RAM1_CS	2.8Vpp 100us / cm	From CPU (U701) to SRAM. 1. Chip Enable controlling read/write access to and from 1st half of SRAM (U704).
RAM2_CS	2.8Vpp 100us / cm	From CPU (U701) to SRAM. 1. Chip Enable controlling read/write access to and from 2nd half of SRAM (U704).
ROM1_CS	2.8Vpp 100us / cm	From CPU (U701) to Eprom. 1. Chip Enable controlling read/write access to and from Eprom (U702).
DP_EN	start up or press key 2.8Vpp 100us / cm	From CPU (U701) to display, via connector J101. 1. Processor selects to enable display. When high, the display is enabled and low disabled.
SC_INT	start up or press key 2.8Vpp 2ms / cm	Speech Coder Interface. This is a signal from uP (U701) to Speech Coder (U801). 1) This is a 20ms timing signal from U701 which times the decoding and encoding function of the Speech Coder U801.
Doubler_EN	power on 2.8vpp 100us / cm	From CPU (U701) to Clock Doubler U805. 1) This signal enables the Clock Doubler U805 which doubles the 13MHz clock to 26MHz to time the Speech Coder. When high U805 is enabled and low disabled.
MF_INT	2.8Vpp 1ms / cm	From BIC to uP. This signal periodically interrupts the uP at 217Hz. During Power Saving mode this signal is set to DC.
BIC_INT	press a key 2.8Vpp 50us / cm	From BIC to uP. This signal interrupts the uP for a number of reasons. 1. Keypad detection 2. Power Sense 3. SIM Functions 4. DSC Bus Status Indicators
UPLINK	2.8Vpp 10us / cm	From butt plug (J600) to BIC chip (U703). This is a comms link from an external peripherale and the phone, and could be either data information or speech information. It is also used to sense the presence of a DHFA and the ignition status of the DHFA with DC levels
DOWNLINK	5Vpp 10us / cm	From BIC chip (U703) to butt plug (J600). This is a comms link from an external peripherale and the phone, and could be either data information or speech information. It is also used to sense the presence of a DHFA and the ignition status of the DHFA with DC levels
CLK_13_IN	1.6Vpp 50ns / cm	From GIF Syn to BIC IC - 13MHz clock.. This is the master clock reference required for the radio

Measured in test mode

AUDIO IN	test mode 08#, 10#, 36# 434#, 477# 2.7Vpp 5us / cm	External audio from butt plug, directly to Speech Coder IC
AUDIO OUT	test mode 08#, 10#, 36# 434#, 477# 2.8Vpp 5us / cm	External audio from Speech Coder via GCAP to butt plug
CLK_AUD	2.8Vpp 5us / cm	This signal is from the BIC to the Speech Coder It is a timing signal and runs at 512KHz, and times the transfer of speech information on the DSC Bus between BIC and Speech Coder.
FS_AUD	2.8Vpp 5us / cm	This signal is from the BIC to the Speech Coder IC. It is a timing signal at 8KHz and provides for frame synchronisation during speech transfer on the DSC bus.

AL LAYER - ORDERABLE SPARES

Part Designator	Part Description	Part Number	Part Designator	Part Description	Part Number
A2 / A3	Ground clips Ant. tube	4209480E01	T902	Choke / Vswitch	2509306J01
AL800	Alert	5009473S01	U703	IC BIC	5109743E13
CR605	Diode / Charger	4809653F03	U704	IC SRAM	5109688L09
J101	32 Pin Display Connector	2809454C02	U801	IC Speech Coder	5199285C01
J600	15 Pin Extern Connector	0909449B04	U802	IC Multiplexer	5109632D44
J601	Flip Flexprint Connector	0909059E01	U803	Codec IC	5109920D15
J802	Microphone Connector	0909195E01	U804	IC Buffer	5109522E10
J900	SIM Connector	4009169E01	U805	IC Frquency Doubler	5109781E47
MIC	Microphone	5009536H15	U900	IC GCAP	5109632D69
Q501	Transitor TX_EN	4809607E05	Y701	XTAL 32.768KHZ	4809995L05
Q601	Power Transistor Charger	4809579E17	U702	Flashed Eprom (boot sector)	5102486T01
Q602	Transistor Batt Feedback	4809939C04	S1 - S3	Volume / Mute Switch	4009060E01
R602	Resisor / Charger Sensing	0680195M64	SH25 - 27	Ground Clips	4204774Z01

TEST COMMANDS

# press 2 sec.	Enter Manual Test Mode
01 #	Exit Manual Test Mode
07 #	Mute Rx Audio Path
08 #	Unmute Rx Audio Path
09 #	Mute Tx Audio Path
10 #	Unmute Tx Audio Path
11 #	Program Main Local Osc. to Channelbb
12 #	Set Tx Power level to fixed valure
19 #	Display SW Version Number of Call Processor
20 #	Display SW Version Number of Modem
22 #	Display SW Version Number of Speech Coder
25 #	Set Continuous AGC
26xxxx #	Set Continuous AFC
31x #	Initiate Pseudo-Random Sequence with Midamble
33xxx #	Synchronize to BCH Carrier
36 #	Initiate Acoustic Loopback
37 #	Stop Test
45xxx #	Serving Cell Power Level
46 #	Display Current Valure od AFC DAC
47x #	Set Audio Volume
58 / xxxxxx #	Display / Modify Security Code
59 / xxx #	Display / Modify Lock Code
60 #	Display IMEI

RX SIGNAL PATH
TX SIGNAL PATH
MAIN VCO SIGNAL PATH
TUNING VOLTAGES
REFERENCE CLOCK
Orderable Part
Non - Orderable Part

Europe, Middle East & Africa Customer Services

Level 3 Authorised

REVISIONS

Europe Middle East & Africa Customer Services	03.07.98
LEVEL 3 COLOUR DIAGRAMS	Rev. 1.2
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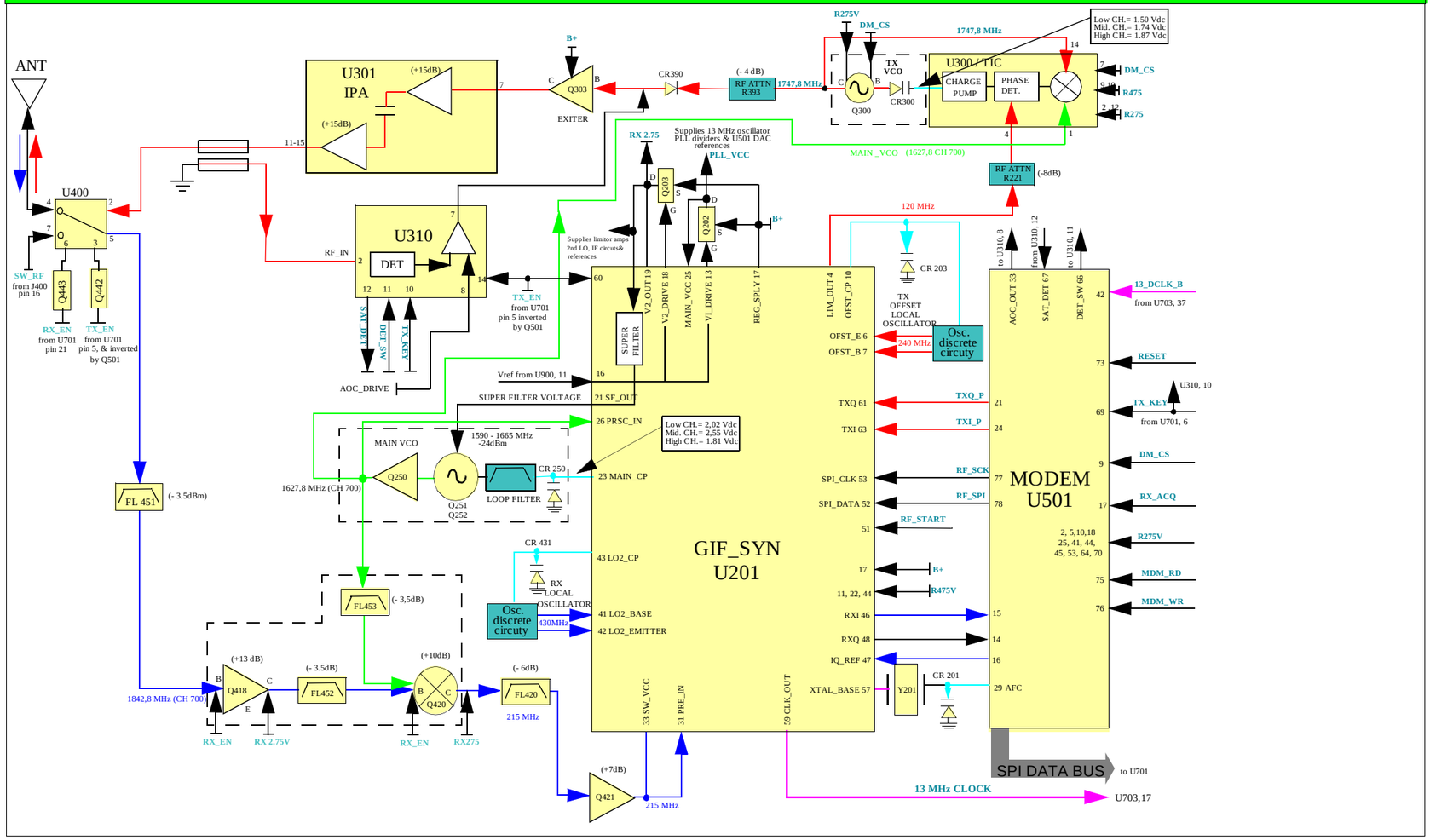
DCS StarTAC RF BLOCK DIAGRAM



RF BOARD SIGNALS

Tx SIGNALS - 11062#, 1215#, 310#

Frequency 217Hz - 1ms/cm

SAT_DET	3Vpp	Signal from PAC to Speech Coder. When PA is at or near saturation signal is low, telling Speech Coder to reduce AOC drive When the PA is not near saturation this is high, telling Speech Coder to increase AOC drive.
DET_SW	Power Step: 04-11 - 50mVpp 12-15 - 900mVpp	Signal from the Speech Coder to the PAC When this signal is low, the internal gain in the PAC is unity. When this signal is high, the internal gain in the PAC is 1.
TX_KEY	2,75Vpp	From uP to PAC. This is a timing signal to the PAC to provide the current path for the initial loop precharge
AOC	Power Step: 04 - 520mVpp 15 - 280mVpp	Signal from SMOC to PAC. This is a linear control voltage for ramp up and ramp down of the PA output level. This controls the voltage on the exciter control output (EXC) from the PAC.
TX_EN	3Vpp	Signal from uP but inverted via Q502 and used to time:- 1. GIF SYN 2. TIC 3. RF Switch Enables Tx Path when high
DM_CS	2,8Vpp	Signal from uP inverted via Q504. Enables TX VCO. When high, this enables Tx path.
TXI	2.1Vpp	From Speech Coder IC to GIF SYN This signal is the in-phase input to the I-Q Modulator of the GIF SYN.
TXQ	2.1Vpp	From Speech Coder IC to GIF SYN This signal is the quadrature input to the I-Q Modulator of the GIF SYN.

Modem Callprocessor Interface

MDM_RD	2,8Vpp 500us/cm	From uP to SSpeech Coder. This signal indicates when the uP is reading data from the Speech Coder. High when enabled.
MDM_WR	2,8Vpp 500us/cm	From uP to Speech Coder. This signal indicates when the uP is writing data to the Speech Coder. High when enabled.

Rx SIGNALS - In Standby Mode

RX_ACQ	2,8Vpp 500us/cm	From uP to Speech Coder This is an interrupt from the uP to the Speech Coder. When high this indicates to the Speech Coder the beginning of the receive burst.
RF_START	2,8Vpp 20us/cm	From uP to GIF SYN Signal to drive the GIFSYN IC. This is a pulsed signal which controls the sending of SPI data to the GIFSYN for all RF functions.-

Rx SIGNALS - 11062#, 262000#, 25013#, 241#

Frequency 217Hz - 1ms/cm

RXI	1.8Vpp 500us/cm	From GIF Syn to Speech Coder IC. This is a baseband analogue signal to A/D convertors of Speech Coder
RXQ	1.8Vpp 500us/cm	From GIF Syn to Speech Coder IC. This is a baseband analogue signal to A/D convertors of Speech Coder
IQ_REF	1.38Vrms 500us/cm	From Speech Coder to GIF Syn. This is a DC level from Speech coder for the RXI and Q signals to ride on.

Europe, Middle East & Africa Customer Services

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RF LAYER - ORDERABLE SPARES

Designa-tor	Description	Number	Designa-tor	Description	Number
CR201	Master Xtal Varactor	4809641F04	Q303	Tx Exciter Transistor	4809527E19
CR203	Tx Local VCO Varactor	4809641F03	Q442	Rf Switch Control Transistor	4809939C08
CR250	Main VCO Varactor	4809641F02	Q443	Rf Switch Control Transistor	4809939C08
CR300	Tx VCO Varactor	4809612F03	Shield 30	Top of Frontend / Antenna Switch	2609225D01
CR390	Transmit Diode	4809948D10	Shield 31	Top of Main VCO / FL420	2609226D01
CR431	Rx Local VCO Varactor	4809641F03	Shield 32	Top of TIC / TX VCO	2609227D01
CR908	Signal Indicator LED	4809118D01	Shield 33	Top of GIFSYN	2609228D01
FL420	IF Saw Filter	9109179E01	Shield 34	Top of PA	2609229D01
FL451	1st Rx Filter	9109068E02	Shield 35	Top of Modem	2609230D01
FL452	2nd Rx Filter	9109155K01	SH60 - 63	Clips Ext. Battery Flexprint	4209388S01
FL453	VCO Filter	9109068E01	U201	GIF SYN	5109632D92
Q202	Receive Power Transistor	4809579E18	U300	TIC	5109632D94
Q203	GIF SYN Power Transistor	4809579E18	U301	PA	5109908K31
Q300	Tx VCO Transistor	4809940E01	U310	PAC	5109632D08
Q418	Rx Amplifier Transistor	4809527E20	U401	Rf Switch	5109572E03
Q420	Rx Mixer	4809940E01	U501	Modem	5199281C03

TEST COMMANDS

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22 #	Display SW Version Number of Speech Coder
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26xxxx #	Set Continuous AFC
31x #	Initiate Pseudo-Random Sequence with Midamble
33xxx #	Synchronize to BCH Carrier
36 #	Initiate Acoustic Loopback
37 #	Stop Test
45xxx #	Serving Cell Power Level
46 #	Display Current Valure od AFC DAC
47x #	Set Audio Volume
58 / xxxxxx #	Display / Modify Security Code
59 / xxx #	Display / Modify Lock Code
60 #	Display IMEI
7100 #	Display Error Code

RX SIGNAL PATH
TX SIGNAL PATH
MAIN VCO SIGNAL PATH
TUNING VOLTAGES
REFERENCE CLOCK
Orderable Part
Non - Orderable Part

FREQUENCIES

CHANNEL	Tx	Rx	MAIN VCO	Rx I.F	Rx I.F L.O	Tx I.F	Tx I.F L.O
512-Low	1710	1805	1590	215	430	120	240
700-Middle	**1747,8**	**1842,8**	**1627,8**	**215**	**430**	**120**	**240**
885-High	1785	1880	1665	215	430	120	240

REVISIONS

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MOTOROLA

PRODUCT DESCRIPTION
Full Document

DCS 1800 Clam RAE

Project No.: A29-01

Version 1.2

Ruchi Mangalik

Jan 6, 1997

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MANAGEMENT SIGNATURES

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	Corporate V.P. & GCCSD G.M.	
Ken Leonhardt		
	Operations	
Chris Colonna		
	Product Marketing Manager	
Allen White		
	GCCSD Product Engineering	
Doug Wick		
	Manufacturing	
Ray Menzel		
	Materials	
Vincent Cheung		
	Quality	
Phil Tutor		
	Finance	
Bernie McGill		
	Distribution	

REVISION HISTORY

Version	Date	Name	Reason
1.0	09-Oct-96	Mary Jo Schavitz	Initial release.
1.1	27-Nov-96	Mary Jo Schavitz	Deletion of SIM lock requirement for Malaysia.
1.2	1-6-97	Ruchi Mangalik	Add GC requirements

1. INTRODUCTION

This product description describes the DCS1800 Clam RAE product for the Greater China South Asia region. This product description makes reference to the latest Asia/Pacific GSM Clam RAE product description, version 1.1, issued by Ruchi Mangalik. Features that are different for DCS 1800 are documented here.

1.1 Product Strategy

As GSM Clam RAE PD. The DCS StarTAC is part of the Signature Series and thus it must follow the Signature guidelines. There no cosmetic differences between the DCS StarTAC and GSM StarTAC because our strategy is to be indifferent and support all technologies. We do not want to make the statement that one technology is more important than the other.

1.2 Target Markets

The countries of Malaysia, Singapore, Thailand, and Hong Kong.

1.3 Distribution Strategy

In keeping with the Global Distribution Strategy, distribution of DCS Clam RAE will be limited to channels that enhance the premium positioning that this product reflects. A distribution strategy for each country must be developed before the DCS Clam RAE can be introduced into that country. Precise distribution plans will be released closer to the launch date (expected to be January 1997).

2. PRODUCT DESCRIPTION

2.1 Physical Characteristics

- Housing
  The GCSA DCS1800 Clam RAE will use the same housing as the Motorola branded Europe DCS1800 19 key Clam RAE. The model number for the Motorola branded Europe DCS1800 19 key Clam RAE is S5993ABB.

- Batteries
  The Auxiliary battery feature must be implemented for the GCSA DCS Clam RAE model.

- Colour
  Initially, all models will use black plastics. However, options for colour will also be investigated. This is dependant on the core group.

- SIM Card
  As GSM Clam RAE PD.

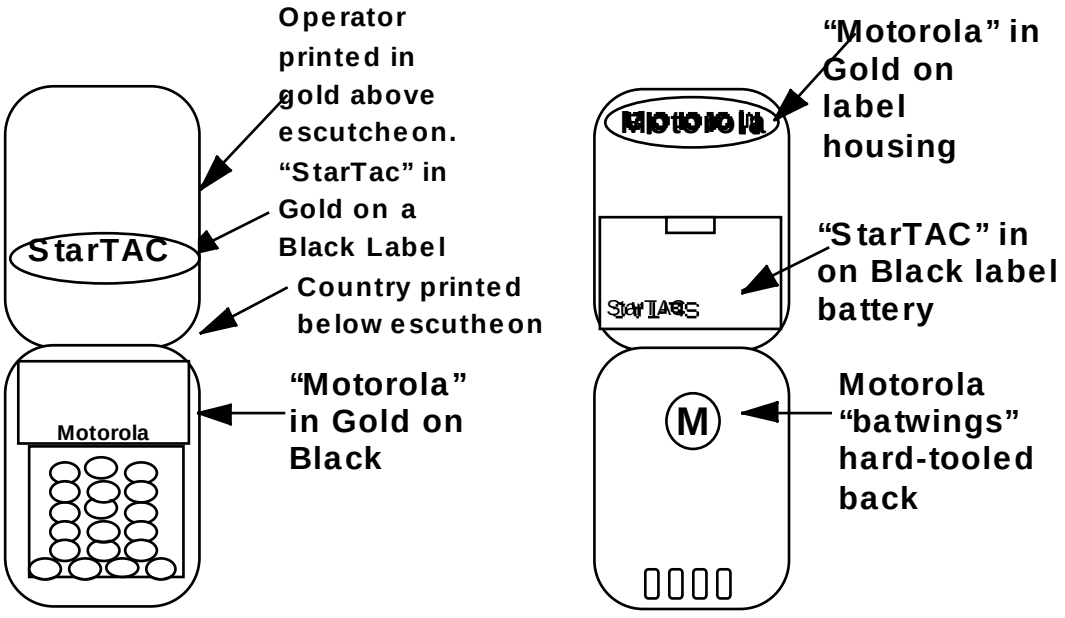
- Display & Indicators
  As GSM Clam RAE PD.

- Antenna
  The DCS1800 Clam RAE will incorporate a retractable DCS1800 antenna which stands vertical when the product is in the holster. The antenna must not interfere with the opening or closing of the Clam, either when extended or retracted.

- Lens
  Identical to the Motorola branded Europe DCS1800 19 key Clam RAE.

- Escutcheons
  Identical to the Motorola branded Europe DCS1800 19 key Clam RAE.

- Keypad
  Identical to the Motorola branded Europe DCS1800 19 key Clam RAE. The alpha numeric keys will conform to ITU-T standard E.161.


Operator printed in gold above escutcheon.
"StarTac" in Gold on a Black Label
Country printed below escutheon
"Motorola" in Gold on Black
StarTAC
Motorola
"Motorola" in Gold on label housing
"StarTAC" in on Black label battery
Motorola "batwings" hard-tooled back
M

Inside View **Outside View**

As shown above, for South Asia, the country name will be tampoed below the inside escutheon for trans-shipment purposes. For Hong Kong, the operator name will be tampoed above the escutheon and no country name.

2.2 Key/Unique Features

The DCS1800 Clam RAE will be the first DCS 'wearable' Motorola product in the GCSA region. It will lead the range in features, size and weight. Initially, it will be positioned as an aspirational product, rather that a mainstream volume product.

Features that will differentiate this product from those of our competitors are:

- Smallest, lightest phone on the market
- Aspirational values
- Auxiliary battery concept, giving unlimited talk and standby time
- Easy to use Personality™ MMI, enhanced for large display
- Full feature set
- VibraCall™, built in, not bolted on
- Full size, retractable SIM card
- Wide range of accessories included in package

2.3 Performance Characteristics

2.3.1 Transceiver Performance

Initial estimates of DCS1800 Clam RAE performance with standard batteries are shown below:

Volume (cc)	Weight (gm)	Talk Time (Mins)	Standby Time (hours)	with Battery
80	81	-	-	Standard Transceiver only
<100	<100	70-90	20-25	LiIon 350 mAh (SNN4875 w/Noryl transceiver
100	105	70-90	20-25	LiIon 350 mAh (SNN4875) w/standard transceiver
100	110	120-140	30-38	LiIon 500 mAh (SNN4667)
109	126	210-280	60-70	LiIon 900 mAh (SNN4668)
109	125	110-140	30-35	NiMH 500 mAh (SNN4669)

Initial estimates of DCS1800 Clam RAE performance with auxiliary battery are shown below; weights and volumes are additional to the core unit (i.e. w/LiIon 500 mAh battery)

Volume (cc)	Weight (gm)	Talk Time (Mins)	Standby Time (hours)	with Battery
40	54	200-260	55-65	LiIon 900 mAh (SNN4867)

2.3.2 Charge Times

Maximum acceptable charge times are shown below.

Battery	Charge time with E.P.+ Standard Travel Charger to 95% charge
NiMH batteries	70 minutes
LiIon batteries	2 1/2 hours

The unit must feautre seamless power transitions with travel charger and cigarette lighter adapter.

2.3.3 Compatible Battery Technology

As GSM Clam RAE PD.

2.3.4 Data Compatibility

As GSM Clam RAE PD.

3. EXPECTED LIFETIME

RAE is a new product platform which will evolve over time into various different product platforms. It is anticipated the DCS 1800 RAE family will last beyond the year 2000. During this time model variations will be introduced.

4. SOFTWARE AND MMI DESCRIPTION

Functional descriptions for each software and MMI feature are defined in the Europe DCS 6700 and StarTAC Software Requirements Document, version 0.2. The StarTAC will be compatible with CPHS version 3.1.

5. MODELS/VERSIONS

5.1 New Sales Models

Only the GCSA and the Motorola branded Europe models are listed below: Malaysia will not require any SIM lock mechanism.

Model Number	Brand	Description
S6373ABB	**Motorola (for Malaysia)**	**Poly Black housing; Non-SIM-locked.**

S6374ABB	**Motorola (for Singapore)**	**Poly Black housing; Non-SIM-locked.**
S6375ABB	**Motorola (for Thailand)**	**Poly Black housing; Non-SIM-locked.**
S6691ABB	**Motorola (for Hong Kong)**	**Poly Black housing; Non-SIM-locked.**
S6691ABB	**Motorola (for HK Peoples Telephone)**	**Poly Black housing; Non-SIM-locked.**
S6692ABB	**Motorola (for HK New World PCS)**	**Poly Black housing; Non-SIM-locked.**
S6693ABB	**Motorola (for HK Manderin Comm)**	**Poly Black housing; Non-SIM-locked.**
S6694ABB	**Motorola (for HK Hutchison)**	**Poly Black housing; Non-SIM-locked.**
S6695ABB	**Motorola (for HK Pacific Link)**	**Poly Black housing; Non-SIM-locked.**
S6696ABB	**Motorola (for HK P Plus)**	**Poly Black housing; Non-SIM-locked.**
S5993 ABB	Motorola (standard Europe)	Black housing; Non-SIM-locked; fully featured. (std. package)

5.1.1 Package Contents

The package contents for all packages contain the following

- SWF transceiver
- 500 mAh Li Ion Main battery SNN4667
- 900 mAh Li Ion Aux Battery SNN4867
- EP power supply (SPN4278)
- Holster (SYN5378)
- Country plug (US/UK/Euro)
- User Manual (68P09395A63)

5.1.2 Flexing Information

FEATURE	DEFAULT SETTING
SIM Lock	None

Home Zone	None
Data	9600 Baud
Earpiece volume	Maximum
Ringer	Standard Tone
Ringer Volume	High
Extended Menus	Off except for Hong Kong
Language	Automatic (English)
Keypad Tone	Normal Tones
Phone Lock	Off
Phone Lock Number	1234
Security Code	000000
Battery Saving Mode	On
Wakeup graphic	Motorola DCS StarTAC
Network Selection	Automatic
Meter During Call	Off (Hong Kong will have InComing call timer ON)
User Definable Quick Access	Yes
Key Answer Only	Off

5.2 Service Requirements

The following items are required for service:

- a Service Transceiver with IMEI, packed without any accessories/manual/etc.
- a Service Printed Circuit Board (PCB), fully phased and tested, with an IMEI.

5.3 Manual Requirements

Manual will be identical to the Motorola branded Europe DCS1800 19 key Clam RAE.

6. PACKAGING/LABELLING REQUIREMENTS

Transceiver labels

The following standard layout should be used for all models:

Note: All models should have the MC² 9600 baud logo.

Transceiver Label
40mm x 20 mm

Type: MP1-1C11	DCS 1800	Encrypted IMEI
MSN: Human Readable	S1234ABCD	
CEPT DCS IMEI: Human Readable	BABT	
Made in USA by Motorola	Logo	
IMEI: Bar Code		
CE Logo	MC^2 Logo	

Box labels

The following standard layout should be used for all models:

Box Label
101.6mm x 63.5mm

<table>
<tr><td colspan="2">Made in the USA
MOTOROLA DCS StarTAC</td><td>Recycle Logo
CE Logo</td></tr>
<tr><td colspan="2">Model Number: Human Readable
Model Number: Bar Code

MSN: Human Readable
MSN: Bar Code

IMEI: Human Readable
IMEI: Bar Code

Sequence Number: Human Readable
Sequence Number: Bar Code</td><td>T-Option:
Bar Code
Human Readable

EAN
Bar Code</td></tr>
</table>

7. PRODUCT NAME/MARKET NAME

The market name for this product is the DCS StarTAC™.

8. TYPE APPROVAL

Full Type Approval must be obtained for the DCS 1800 StarTAC before final ship authorisation. Both internal and field operator testing must be conducted in the locations where this phone is to be sold before final ship authorisation, also.

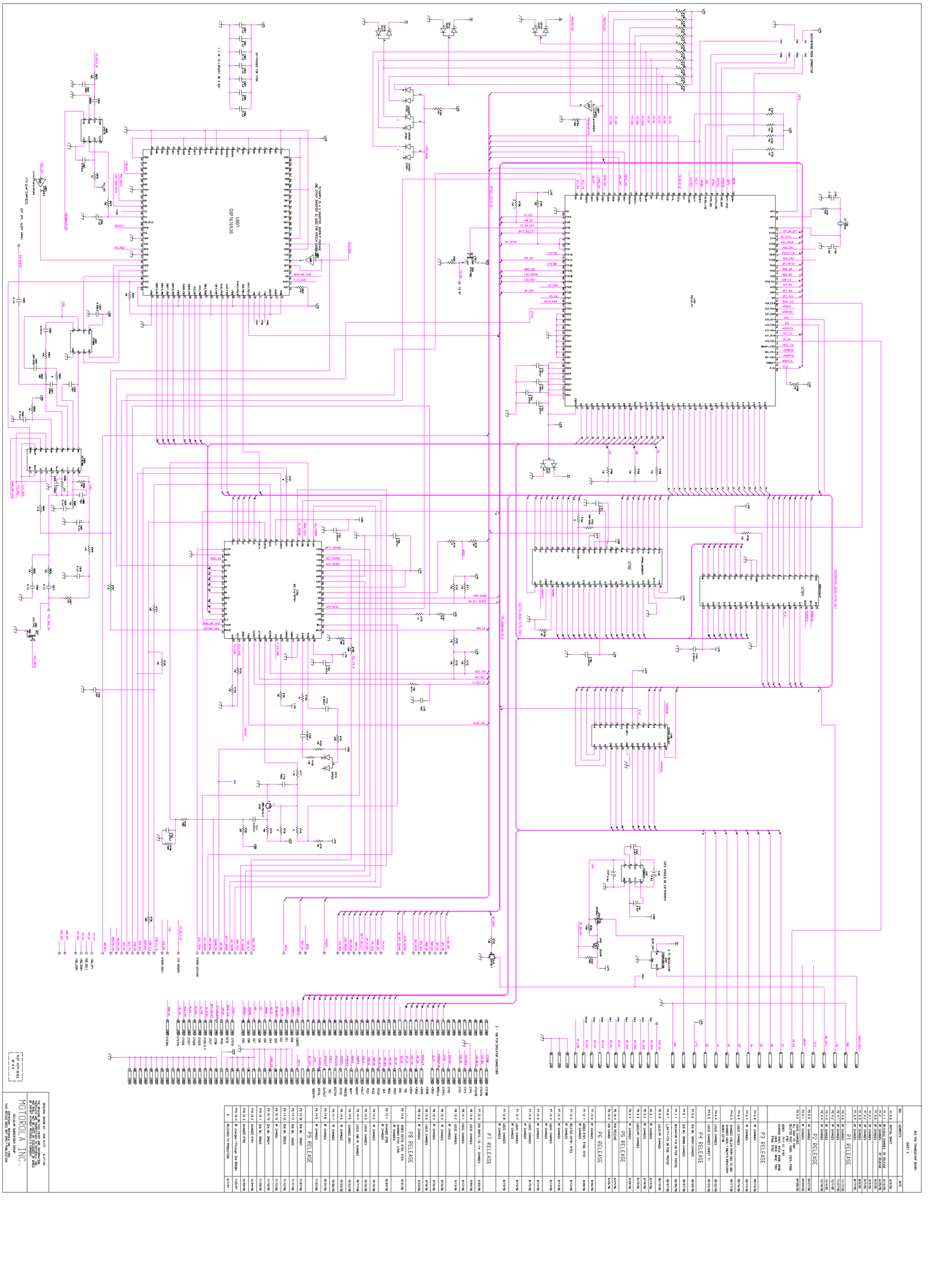
9. ACCESSORIES & COMPATIBILITY

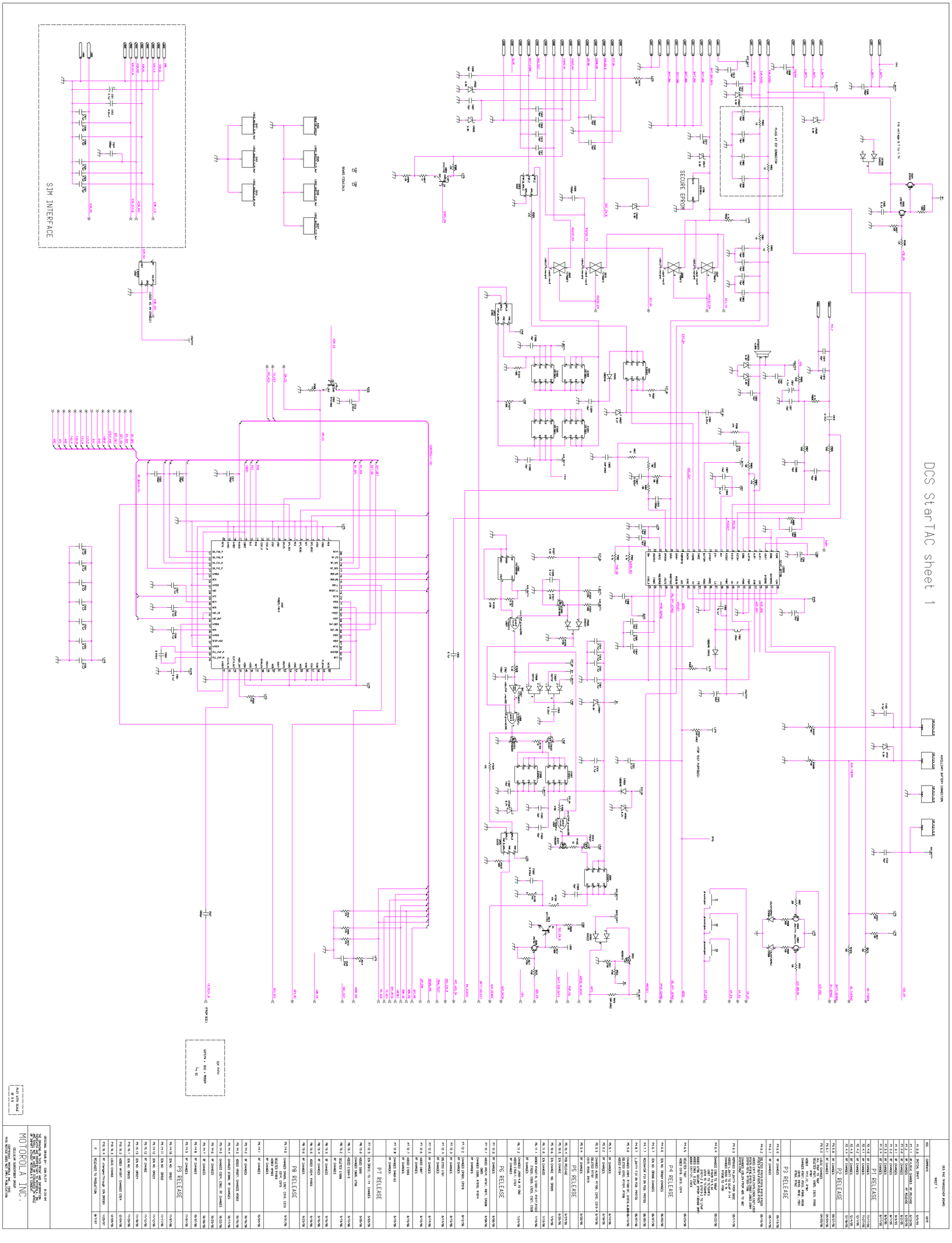
9.1 Current

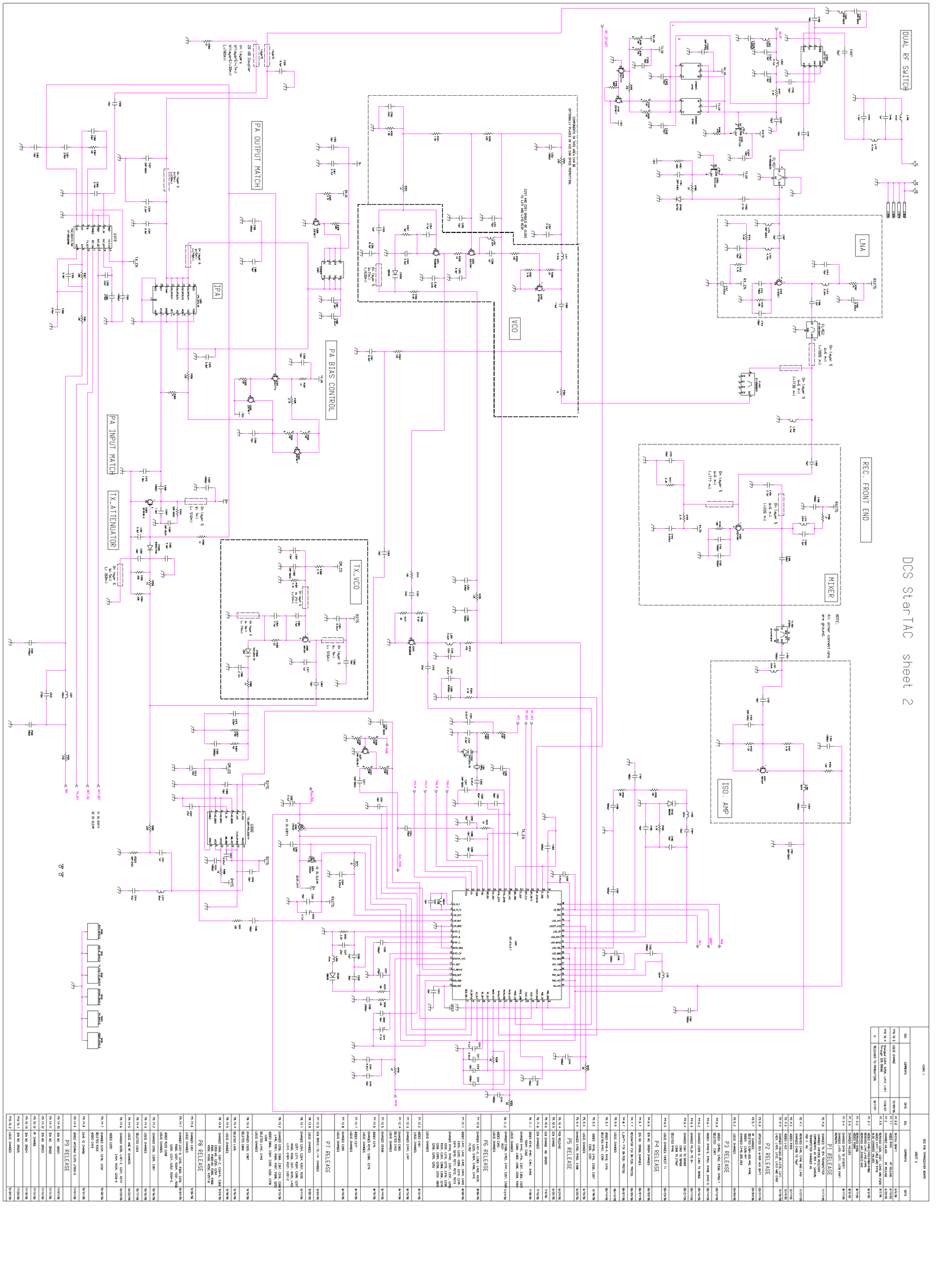
Part Number	Name	Compatibility Notes
SNN4875	Slim Main 350 mAh LiIon Battery	
SNN4667	Slim Main 500 mAh LiIon Battery	
SNN4668	Standard Main LiIon 900 mAh Battery	
SNN4867	Slim AUX LiIon 900 mAh Battery	
SPN4278	Power Adapter	
SYN4656	UK Adapter Plug	
SYN4655	European Adapter Plug	
SPN4435	Rapid Desktop Charger	
SYN4241	Cigarette Lighter Adapter	
SYN5378	Standard Belt Holster	
SYN4653	Slimline Belt Holster	
SYN5621	Holster (Aux) Norvl	
SYN5622	Slimline Holster (Non-Aux) Norvl	
S5338A	Hands Free Car Kit	
SYN4898	Leather Pouch-Black	
SYN4899	Leather Purse PAK-Black	
S6319	Cellect™ 1+	
S6320	Cellect™ 2 for Australia	
S5702A	PC Card 9600 Baud Data Interface	

9.2 Planned

Part Number	Name	Compatibility Notes
SNN4577	Auxiliary: Extra Capacity 1000mAh NiMH	
SNN4669	Standard 500 mAh NiMH	
TBD	Double Stacked 1800 Lithium Ion battery	
SNN4609	LiIon 1400 mAh	




SIM INTERFACE
SECURE EPROM
DCS StarTAC sheet 1
MOTOROLA INC.


DUAL RF SWITCH
LNA
VCO
PA BIAS CONTROL
PA OUTPUT MATCH
PA
PA INPUT MATCH
TX_ATTENUATOR
TX_VCO
MIXER
REC. FRONT END
ISO. AMP
DCS StarTAC Sheet 2
P1 RELEASE
P2 RELEASE
P3 RELEASE
P4 RELEASE
P5 RELEASE
P6 RELEASE
P7 RELEASE
P8 RELEASE

MOTOROLA

ECSD CUSTOMER SERVICE POLICY

DCS 1800 StarTac (clam)

MOTOROLA CONFIDENTIAL PROPRIETY

Document Approval ECSD European Customer Services Mgr	Date

ECSD Customer Service Policy

Purpose:

This document specifies the Customer Service requirements to provide after sales support for the DCS StarTac product.

Model Type:

TBC

Responsibility:

David McHugh (European Customer Services)
Tel 44 1256 790172
Fax 44 1256 819561

Document Contents:

Section	Contents
1.0	Product Overview
2.0	Service Policy
3.0	Service Requirements
4.0	Distribution Overview
5.0	Quality Reporting and metrics

SECTION 1.0 - PRODUCT OVERVIEW

The DCS StarTac is a high tier product offering market leadership in terms of size, weight and features. The product will initially be positioned as a premium product targeted at the aspirational market segment. The DCS StarTac will have a similar form factor to the GSM variant, utilising the GSM housing supporting both 17 key formats for Co-branded product (Orange. Eplus, Bouygues) and the 19 key format for Motorola versions.

The key product features include:

* Smallest and lightest phone on the market.
* The first telephone in the Wearable category.
* Easy to use Personality MMI, enhanced for large display.
* Full feature set.
* Vibra Call (built in)
* Full size, retractable SIM card.
* Wide range of accessories included in package.

The product will be distributed through the principal European DCS Operator channels, namely Eplus, One2One, Orange and Bouygues.

SECTION 2.0 - SERVICE POLICY

2.1 Warranty:

Product will be sold with the standard 12 months warranty terms and conditions. Accidental damage misuse, retailers extended warranties will not be supported under warranty. Non warranty repairs will be available at agreed fixed repair prices.

Proof of purchase will be required to validate all warranty claims. Nb. Customer have the option to purchase additional warranty.

2.2 Out Of Box Failure Policy:

The standard OBF criteria will apply. Early life failurers to be returned to Manufacturing for root cause analysis, to guard against epidemic criteria. Manufacturing to bear the costs of early life failure.

2.3 Motorola branded product will be supported under a Low tier DCS Loaner programme. or alternative low cost service strategy. (To be agreed with European Customer Service Manager). The product may be serviced by appointed Motorola Service Hubs (level 2/3) and the Motorola HTC (level 4) at the discretion of the regional service managers.

2.4 Customer support (End user) will be available through dedicated Call Centres and In Country Help desks.

SECTION 3.0 - SERVICE REQUIRMENTS

3.1 Technical Training:

The GSM StarTac training will address this requirement.

3.2 Documentation:

Level 2 Service Documentation will be required to include:

Product Overview

DCS 1800 basic principles of operation

Technical Specifications

Testing and Phasing

Test Mode Features

Product Assembly / Disassembly

Level 2 Troubleshooting

Service Parts Lists

3.3 Service Parts:

A dedicated service parts list and prices (level 2) will be provided, in line with product launch. To be included in level 2 service manual. Service Transceiver and PCBs will be required to support field service.

3.4 Test Equipment and Tools:

Engineering to define a recommended list of unique service tools and test equipment,

SECTION 4.0 - DISTRIBUTION OVERVIEW

MOTOROLA CONFIDENTIAL PROPRIETY

4.1 Estimated launch date = Dec 96
Estimated launch volumes

4.2

Dec	2.5k
Jan97	2.5k
Feb	2.8k
Mar	2.8k
Apr	2.8k
May	2.8k
Jun-Aug	9.2k
Sep-Nov	9.2k

	34.6k

SECTION 5.0 -QUALITY REPORTING, METRICS

5.1 Field Return Rate:
The 1996 Projected Field Return Rates = TBA (Based on Engineering ALT Results)

5.2 Field product performance to be monitored using EPPRS system.
Monthly repair data can then be provided to Engineering which includes:
*% field return rate,
* paynter chart (failure by month of manufacture
* Repair Analysis
* Component Analysis (Top 10 Component failurers)

5.3 Field Returns Improvement Plan:
20% year on year (Q4-Q4) reduction on the number of field returns.

END.

DCS STARTAC - SUG 1043 - FULL PARTS LISTING

1	SHN6319A	HSNG DCS UNIQUE 17KEY BLK	1	1	1	M	Y Y
2	0109212D01	ASSY HSNG XCVR FRNT BLK	1	1	1	B	Y N
2	0109284S01	ASSY REAR AUX	1	1	1	B	Y N
3	0109470S01	ASSY GSM AUX FLEX	1	2	1	B	Y N
4	4209389S01	CLIP BOTTOM FLEX	1	2	1	B	Y N
4	8409390S01	PCB AUX FLEX INTERCONNECT	1	2	1	B	Y N
3	1509283S01	HSNG REAR AUX	1	2	1	B	Y N
3	3609217D01	KNOB EJECT	1	2	1	B	Y N
3	4209218D01	CLIP EJECT/CARD COMPRESSION	1	2	1	B	Y N
3	4309134E01	BUSHING THREADED REAR HSNG	1	2	1	B	Y N
3	6109219D01	LIGHTGUIDE ALERT	1	2	1	B	Y N
2	0109322D01	ASSY LENS RAE	1	1	1	B	Y N
2	0109485D01	ASSY HSNG MAIN FLIP BLK	1	1	1	B	Y N
3	0109207D01	ASSEMBLY FLIP	1	2	1	B	Y N
4	1109210D01	ADHESIVE RTC BATTERY	1	2	1	B	Y N
4	1109410R01	ADHESIVE SPEAKER	1	2	1	B	Y N
4	3909492B01	CONTACT BLOCK BATTERY	2	2	1	B	Y N
4	5009076E01	SPKR DYN EARPC 20X50 MM	1	2	1	B	Y N
4	5909127D03	MOTOR VIBRATOR 0.7V 10K RPM	1	2	1	B	Y N
4	6009519L03	BATT LI COIN CELL	1	2	1	B	Y N
4	8409420D01	PCB FLEX BD	1	2	1	B	Y N
3	0109486D01	ASSY MAIN FLIP GSM	1	2	1	B	Y N
4	1509222D01	HSNG SPEAKER FRNT	1	2	1	B	Y N
4	1509223D01	HSNG MAIN FLIP BLK	1	2	1	B	Y N
4	3209208D01	GASKET SPEAKER	1	2	1	B	Y N
4	5983583N18	MAGNET GSM RAE	1	2	1	B	Y N
3	1509210E01	HSNG FLEX BARREL BLK	1	2	1	B	Y N
3	1509224D01	HSNG SPEAKER REAR	1	2	1	B	Y N
3	3509120R01	FELT REAR SPKR	1	2	1	B	Y N
3	7509532K12	PAD SHOCK	1	2	1	B	Y N
1	SUG1044A	XCVR CORE DCS CLAM RAE	1	1	1	M	Y Y
2	SHN6227A	HSNG & HDW DCS RAE COMMON	1	1	1	M	Y Y
3	0309333C01	SCREW TRILOBE W/CAP WASHER	2	1	1	B	Y N
3	0509220D01	GROMMET MIC	1	1	1	B	Y N
3	0509221D01	GROMMET ALERT	1	1	1	B	Y N
3	1109155J01	ADHESIVE DCA COVER	1	1	1	B	Y N
3	1109387L01	ALERT GROMMET ADHESIVE	1	1	1	B	Y N
3	1509136D01	HSNG FLEX COVER	1	1	1	B	Y N
3	2609231D01	SHIELD LOGIC	1	1	1	B	Y N
3	3509001R01	SCREEN ALERT	1	1	1	B	Y N
3	3709013J01	TUBE ANTENNA S.S.	1	1	1	B	Y N
3	3809170E01	ACTR KYPD GSM RAE	1	1	1	B	Y N
3	4709050R01	SHAFT GSM RIGHT	1	1	1	B	Y N
3	5009536H15	MIC LEADED W/PINS	1	1	1	B	Y N
3	5409150R01	LABEL FLEX	1	1	1	B	Y N

3 5509242E01 HINGE GSM 1 1 1 B Y N
3 7509165R01 PAD SHOCK 1 1 1 B Y N
3 8509173J01 ANT DIRECT CNTCT 1.8GHZ DCS 1 1 1 B Y N
2 SLG1003A BD SET DCS CLAM RAE 1 1 1 M Y Y
3 SLG4014A XCVR BD DCS 1800 RAE 1 1 1 M Y Y
4 0109026A08 XCVR BD RAE DCS TOP SIDE 1 1 1 M Y Y
5 0609118R01 VARISTOR CHIP 0805 SMD 2 1 1 B Y N
5 0609591M39 RES CHIP DUAL 15K 5% 0.63W 4 1 1 B Y N
5 0609591M45 RES CHIP DUAL 47K 5% 0.63W 6 1 1 B Y N
5 0660076N01 RES CHIP 10 5 1/16 0603 2 1 1 B Y N
5 0662057M01 RES. CHIP 0 5% 20X40 4 1 1 B Y N
5 0662057M26 RES. CHIP 10 5% 20X40 5 1 1 B Y N
5 0662057M50 RES. CHIP 100 5% 20X40 8 1 1 B Y N
5 0662057M58 RES. CHIP 220 5% 20X40 1 1 1 B Y N
5 0662057M61 RES CHIP 300 5% 20X40 1 1 1 B Y N
5 0662057M68 RES. CHIP 560 5% 20X40 3 1 1 B Y N
5 0662057M74 RES. CHIP 1000 5% 20X40 7 1 1 B Y N
5 0662057M78 RES. CHIP 1500 5% 20X40 1 1 1 B Y N
5 0662057M80 RES. CHIP 1800 5% 20X40 1 1 1 B Y N
5 0662057M90 RES. CHIP 4700 5% 20X40 6 1 1 B Y N
5 0662057M92 RES. CHIP 5600 5% 20X40 1 1 1 B Y N
5 0662057M98 RES. CHIP 10K 5% 20X40 13 1 1 B Y N
5 0662057N03 RES. CHIP 15K 5% 20X40 16 1 1 B Y N
5 0662057N05 RES. CHIP 18K 5% 20X40 4 1 1 B Y N
5 0662057N06 RES. CHIP 20K 5% 20X40 2 1 1 B Y N
5 0662057N07 RES. CHIP 22K 5% 20X40 1 1 1 B Y N
5 0662057N09 RES. CHIP 27K 5% 20X40 2 1 1 B Y N
5 0662057N15 RES. CHIP 47K 5% 20X40 11 1 1 B Y N
5 0662057N19 RES. CHIP 68K 5% 20X40 1 1 1 B Y N
5 0662057N23 RES. CHIP 100K 5% 20X40 8 1 1 B Y N
5 0662057N29 RES. CHIP 180K 5% 20X40 3 1 1 B Y N
5 0662057N33 RES. CHIP 270K 5% 20X40 1 1 1 B Y N
5 0662057N39 RES CHIP 470K 5% 20X40 4 1 1 B Y N
5 0680195M64 RES 0.24 OHM 1/2W 1 1 1 B Y N
5 0909449B04 RECEPT MOD 15PIN INSMLD 1 1 1 B Y N
5 2109622N06 CAP CER CHIP NPO CLASS I 1 1 1 B Y N
5 2113740F20 CAP CHIP REEL CL1 +/-30 5.1 1 1 1 B Y N
5 2113740F35 CAP CHIP REEL CL1 +/-30 22.0 1 1 1 B Y N
5 2113741F25 CAP CHIP CL2 X7R REEL 1000 1 1 1 B Y N
5 2113741F49 CAP CHIP CL2 X7R REEL .01UF 2 1 1 B Y N
5 2113743A27 CAP CHIP .470 UF 10% 16V 2 1 1 B Y N
5 2113743E07 CER CHIP CAP .022UF 1 1 1 B Y N
5 2113743E11 CAP CHIP .039 UF 10% X7R 1 1 1 B Y N
5 2113743E12 CAP CHIP .047 UF 10% X7R 12 1 1 B Y N
5 2113743E20 CAP CHIP .10 UF 10% 15 1 1 B Y N
5 2113743H14 CAP CHIP 10.0 UF 16V +80-20% 3 1 1 B Y N
5 2113743L05 CAP CHIP 330 PF 10% X7R 1 1 1 B Y N
5 2113743L17 CAP CHIP 1000 PF 10% X7R 1 1 1 B Y N
5 2113743L21 CAP CHIP 1500 PF 10% X7R 2 1 1 B Y N
5 2113743L41 CAP CHIP 10000 PF 10% X7R 3 1 1 B Y N

5 2113743M08 CAP CHIP 22000 PF +80-20% Y5V 2 1 1 B Y N
5 2113743M24 CAP CHIP 100000 PF +80-20% Y5V 3 1 1 B Y N
5 2113743N12 CAP CHIP 2.7 PF +-.25PF COG 1 1 1 B Y N
5 2113743N14 CAP CHIP 3.3 PF +-.25PF COG 1 1 1 B Y N
5 2113743N26 CAP CHIP 10.0 PF 5% COG 28 1 1 B Y N
5 2113743N50 CAP CHIP 100 PF 5% COG 1 1 1 B Y N
5 2113743N54 CAP CHIP 150 PF 5% COG 1 1 1 B Y N
5 2113928J06 CAP CER CHIP 4.7 UF 10% 10V 5 1 1 B Y N
5 2309121D19 CAP CHIP TANT 10 UF 10% 10 V 2 1 1 B Y N
5 2309121D23 CAP CHIP TANT 68 UF 10% 10 V 1 1 1 B Y N
5 2311049A54 CAP TAN CHIP A/P 3.3 20 16 4 1 1 B Y N
5 2311049A56 CAP TAN CHIP A/P 4.7 20 10 2 1 1 B Y N
5 2462587V24 CHIP IND 15 NH 5% 0805 1 1 1 B Y N
5 2509306J01 CHOKE 15 UH SMD 1 1 1 B Y N
5 2609827G03 SHIELD SPACER 1 1 1 B Y N
5 2809454C02 PLUG LO PROFILE SMD 32 POS 1 1 1 B Y N
5 3909578M01 CONTACT BATT SMT 4 1 1 B Y N
5 4009060E01 SW TACTILE SMD 3 1 1 B Y N
5 4209189E01 CLIP LOGIC SHIELD #1 3 1 1 B Y N
5 4209190E01 CLIP LOGIC SHIELD #2 3 1 1 B Y N
5 4209233D01 CLIP ANTENNA TUBE 1 1 1 B Y N
5 4209480E01 CLIP ANTENNA 2 1 1 B Y N
5 4809579E09 TSTR MOSFET P-CHAN 2SJ346 1 1 1 B Y N
5 4809579E11 TSTR MOSFET P-CHAN NDS0601 1 1 1 B Y N
5 4809579E16 TSTR MOSFET N-CHAN TN0200T 1 1 1 B Y N
5 4809579E17 TSTR MOSFET P-CHAN SI9424 1 1 1 B Y N
5 4809579E18 TSTR MOSFET P-CHAN TP0101T 1 1 1 B Y N
5 4809605E02 TSTR SIG NPN 2SC4617 2 1 1 B Y N
5 4809606E02 DIODE DUAL ARRAY DAN222 2 1 1 B Y N
5 4809606E03 DIODE DUAL ARRAY DAP222 4 1 1 B Y N
5 4809606E07 DIODE DUAL ARRAY DA221 4 1 1 B Y N
5 4809606E08 DIODE DUAL SCHOTTKEY RB715F 1 1 1 B Y N
5 4809607E02 TSTR SIG PNP 25A1774 2 1 1 B Y N
5 4809608E03 TSTR DIG PNP DTA114YE 2 1 1 B Y N
5 4809653F03 DIODE SCHOTTKY 1A 10BQ040 SMD 3 1 1 B Y N
5 4809788E06 DIODE ZENER 6.8V UDZ6.8B 5 1 1 B Y N
5 4809788E08 DIODE ZENER 8.2V UDZTE178.2B 3 1 1 B Y N
5 4809939C04 TSTR DUAL PNP/NPN UMC3 2 1 1 B Y N
5 4809939C05 TSTR DUAL NPN/PNP UMH 5 1 1 1 B Y N
5 4809940E02 TSTR DIG NPN DTC114YE 1 1 1 B Y N
5 4809940E03 TSTR DIG NPN DTC114TE 1 1 1 B Y N
5 4809995L05 XTAL QUARTZ 32.768KHZ CC4V-T1 1 1 1 B Y N
5 4813823A07 XSTR N-CH TMOS FET 2N7002LT1 1 1 1 B Y N
5 4813824A21 XSTR PNP 60V .6A GENP B=100 1 1 1 B Y N
5 5009473S01 ALERT EM 5V SMD 1 1 1 B Y N
5 5109522E10 IC 3-INV LMOS TC7W04FU 1 1 1 B Y N
5 5109522E13 IC BILAT SW TC7S66FU 4 1 1 B Y N
5 5109632D44 IC CUST DIG POT/ATTN DS1866 1 1 1 B Y N
5 5109632D54 IC CUST BICMOS GCAP 48QFP 1 1 1 B Y N
5 5109632D54 IC CUST BICMOS GCAP 48QFP 1 4 1 B Y N

5 5109688L09 IC SRAM 64KX16 M5M51016BVP 1 1 1 B Y N
5 5109743E12 IC ASIC BIC 4.01 1 4 1 B Y N
5 5109743E13 IC ASIC BIC 4.01 S38138EC10 1 1 1 B Y N
5 5109781E47 IC LIN CLCK DBLR W42C70 1 1 1 B Y N
5 5109781E50 IC LIN 5V REG LM2980 SOT23 1 1 1 B Y N
5 5109841C30 IC MCU SCSF416776 1 1 1 B Y N
5 5109920D12 IC DC-DC CONV INVDBLR 682EOA 1 1 1 B Y N
5 5109920D15 IC PCM CODEC MC14LC5480SDR2 1 1 1 B Y N
5 5199245A01 IC FLASH PROM 512KX16 28F800-B 1 1 1 B Y N
5 5199285C01 IC MASK DSP 1616-S31EEK 38IW 1 1 1 B Y N
5 5199295A01 IC ROM 64 BIT DS2401 FLIP CHIP 1 1 1 B Y N
5 5199301A01 IC EEPROM SPCL 8KX8 28BV64 1 1 1 B Y N
4 0109026A09 XCVR BD RAE DCS BOTTOM SIDE 1 1 1 M Y Y
5 0609591M37 RES CHIP DUAL 10K 5% 0.63W 3 1 1 B Y N
5 0660076N57 RES CHIP 2200 OHM 1/16 W 1 1 1 B Y N
5 0662057M01 RES. CHIP 0 5% 20X40 3 1 1 B Y N
5 0662057M26 RES. CHIP 10 5% 20X40 4 1 1 B Y N
5 0662057M30 RES. CHIP 15 5% 20X40 2 1 1 B Y N
5 0662057M34 RES. CHIP 22 5% 20X40 1 1 1 B Y N
5 0662057M36 RES. CHIP 27 5% 20X40 1 1 1 B Y N
5 0662057M38 RES CHIP 33 5% 20X40 3 1 1 B Y N
5 0662057M43 RES. CHIP 51 5% 20X40 1 1 1 B Y N
5 0662057M44 RES CHIP 180K 5% 20X40 1 1 1 B Y N
5 0662057M48 RES. CHIP 82 5% 20X40 1 1 1 B Y N
5 0662057M50 RES. CHIP 100 5% 20X40 1 1 1 B Y N
5 0662057M52 RES. CHIP 120 5% 20X40 2 1 1 B Y N
5 0662057M54 RES. CHIP 150 5% 20X40 3 1 1 B Y N
5 0662057M56 RES. CHIP 180 5% 20X40 1 1 1 B Y N
5 0662057M58 RES. CHIP 220 5% 20X40 4 1 1 B Y N
5 0662057M60 RES. CHIP 270 5% 20X40 1 1 1 B Y N
5 0662057M62 RES. CHIP 330 5% 20X40 3 1 1 B Y N
5 0662057M66 RES. CHIP 470 5% 20X40 1 1 1 B Y N
5 0662057M74 RES. CHIP 1000 5% 20X40 8 1 1 B Y N
5 0662057M76 RES. CHIP 1200 5% 20X40 1 1 1 B Y N
5 0662057M78 RES. CHIP 1500 5% 20X40 1 1 1 B Y N
5 0662057M80 RES. CHIP 1800 5% 20X40 1 1 1 B Y N
5 0662057M81 RES. CHIP 2000 5% 20X40 2 1 1 B Y N
5 0662057M82 RES. CHIP 2200 5% 20X40 4 1 1 B Y N
5 0662057M83 RES CHIP 2400 5% 20X40 1 1 1 B Y N
5 0662057M84 RES. CHIP 2700 5% 20X40 3 1 1 B Y N
5 0662057M85 RES. CHIP 3000 5% 20X40 1 1 1 B Y N
5 0662057M86 RES. CHIP 3300 5% 20X40 1 1 1 B Y N
5 0662057M90 RES. CHIP 4700 5% 20X40 4 1 1 B Y N
5 0662057M92 RES. CHIP 5600 5% 20X40 4 1 1 B Y N
5 0662057M98 RES. CHIP 10K 5% 20X40 5 1 1 B Y N
5 0662057N01 RES CHIP 12K 5% 20X40 2 1 1 B Y N
5 0662057N03 RES. CHIP 15K 5% 20X40 2 1 1 B Y N
5 0662057N06 RES. CHIP 20K 5% 20X40 1 1 1 B Y N
5 0662057N07 RES. CHIP 22K 5% 20X40 1 1 1 B Y N
5 0662057N11 RES. CHIP 33K 5% 20X40 1 1 1 B Y N

5	0662057N15	RES. CHIP 47K 5% 20X40	5	1	1	B	Y	N
5	0662057N19	RES. CHIP 68K 5% 20X40	1	1	1	B	Y	N
5	0662057N23	RES. CHIP 100K 5% 20X40	2	1	1	B	Y	N
5	0662057N29	RES. CHIP 180K 5% 20X40	2	1	1	B	Y	N
5	0662057N31	RES. CHIP 220K 5% 20X40	1	1	1	B	Y	N
5	0662057N33	RES. CHIP 270K 5% 20X40	3	1	1	B	Y	N
5	0662057N39	RES CHIP 470K 5% 20X40	2	1	1	B	Y	N
5	0909059E01	RECPT ZIF 16 POS SMD	1	1	1	B	Y	N
5	0909195E01	SKT BOT ENTRY 2 POS	1	1	1	B	Y	N
5	2109622N06	CAP CER CHIP NPO CLASS I	1	1	1	B	Y	N
5	2109622N14	CAP CER CHIP NPO CLASS I	1	1	1	B	Y	N
5	2109622N16	CAP CER CHIP NPO CLASS I	1	1	1	B	Y	N
5	2113740A01	CAP CHIP REEL CL1 +/-30 .5	1	1	1	B	Y	N
5	2113740A63	CAP CHIP REEL CL1 +/-30 220	1	1	1	B	Y	N
5	2113740A65	CAP CHIP REEL CL1 +/-30 270	4	1	1	B	Y	N
5	2113740A73	CAP CHIP REEL CL1 +/-30 560	1	1	1	B	Y	N
5	2113740B78	CAP CHIP REEL CL1 +/-30 1800	1	1	1	B	Y	N
5	2113740B81	CAP CHIP REEL CL1 +/-30 2400	1	1	1	B	Y	N
5	2113740F03	CAP CHIP REEL CL1 +/-30 1.0	4	1	1	B	Y	N
5	2113740F07	CAP CHIP REEL CL1 +/-30 1.5	5	1	1	B	Y	N
5	2113740F09	CAP CHIP REEL CL1 +/-30 1.8	1	1	1	B	Y	N
5	2113740F11	CAP CHIP REEL CL1 +/-30 2.2	3	1	1	B	Y	N
5	2113740F12	CAP CHIP REEL CL1 +/-30 2.4	1	1	1	B	Y	N
5	2113740F13	CAP CHIP REEL CL1 +/-30 2.7	2	1	1	B	Y	N
5	2113740F15	CAP CHIP REEL CL1 +/-30 3.3	4	1	1	B	Y	N
5	2113740F19	CAP CHIP REEL CL1 +/-30 4.7	3	1	1	B	Y	N
5	2113740F21	CAP CHIP REEL CL1 +/-30 5.6	1	1	1	B	Y	N
5	2113740F23	CAP CHIP REEL CL1 +/-30 6.8	2	1	1	B	Y	N
5	2113740F25	CAP CHIP REEL CL1 +/-30 8.2	1	1	1	B	Y	N
5	2113740F27	CAP CHIP REEL CL1 +/-30 10.0	19	1	1	B	Y	N
5	2113740F29	CAP CHIP REEL CL1 +/-30 12	1	1	1	B	Y	N
5	2113740F31	CAP CHIP REEL CL1 +/-30 15.0	2	1	1	B	Y	N
5	2113740F33	CAP CHIP REEL CL1 +/-30 18.0	2	1	1	B	Y	N
5	2113740F35	CAP CHIP REEL CL1 +/-30 22.0	4	1	1	B	Y	N
5	2113740F37	CAP CHIP REEL CL1 +/-30 27.0	2	1	1	B	Y	N
5	2113740F39	CAP CHIP REEL CL1 +/-30 33.0	1	1	1	B	Y	N
5	2113740F43	CAP CHIP REEL CL1 +/-30 47.0	1	1	1	B	Y	N
5	2113740F47	CAP CHIP REEL CL1 +/-30 68	1	1	1	B	Y	N
5	2113740F49	CAP CHIP REEL CL1 +/-30 82.0	1	1	1	B	Y	N
5	2113740F51	CAP CHIP REEL CL1 +/-30 100.0	3	1	1	B	Y	N
5	2113740F57	CAP CHIP REEL CL1 +/-30 180	1	1	1	B	Y	N
5	2113740F59	CAP CHIP REEL CL1 +/-30 220.0	1	1	1	B	Y	N
5	2113740F61	CAP CHIP REEL CL1 +/130 270	1	1	1	B	Y	N
5	2113740G29	CAP CER CHIP 10PF 2%	1	1	1	B	Y	N
5	2113741B39	CAP CHIP CL2 X7R REEL 5600	1	1	1	B	Y	N
5	2113741F13	CAP CHIP CL2 X7R REEL 330	1	1	1	B	Y	N
5	2113741F25	CAP CHIP CL2 X7R REEL 1000	13	1	1	B	Y	N
5	2113741F41	CAP CHIP CL2 X7R REEL 4700	1	1	1	B	Y	N
5	2113741F49	CAP CHIP CL2 X7R REEL .01UF	9	1	1	B	Y	N
5	2113743A23	CAP CHIP .220 UF 10% X7R	1	1	1	B	Y	N

5 2113743L17 CAP CHIP 1000 PF 10% X7R 9 1 1 B Y N
5 2113743L41 CAP CHIP 10000 PF 10% X7R 5 1 1 B Y N
5 2113743M24 CAP CHIP 100000 PF +80-20% Y5V 13 1 1 B Y N
5 2113743N05 CAP CHIP 1.2 PF +-.25PF COG 1 1 1 B Y N
5 2113743N07 CAP CHIP 1.5 PF +-.25PF COG 1 1 1 B Y N
5 2113743N12 CAP CHIP 2.7 PF +-.25PF COG 3 1 1 B Y N
5 2113743N14 CAP CHIP 3.3 PF +-.25PF COG 1 1 1 B Y N
5 2113743N18 CAP CHIP 4.7 PF +-.25PF COG 5 1 1 B Y N
5 2113743N22 CAP CHIP 6.8 PF + -.5PF COG 1 1 1 B Y N
5 2113743N23 CAP CHIP 7.5 PF + -.5PF COG 1 1 1 B Y N
5 2113743N26 CAP CHIP 10.0 PF 5% COG 32 1 1 B Y N
5 2113743N30 CAP CHIP 15.0 PF 5% COG 1 1 1 B Y N
5 2113743N34 CAP CHIP 22.0 PF 5% COG 4 1 1 B Y N
5 2113743N36 CAP CHIP 27.0 PF 5% COG 1 1 1 B Y N
5 2113743N40 CAP CHIP 39.0 PF 5% COG 1 1 1 B Y N
5 2113743N46 CAP CHIP 68.0 PF 5% COG 1 1 1 B Y N
5 2113743N50 CAP CHIP 100 PF 5% COG 4 1 1 B Y N
5 2113743N54 CAP CHIP 150 PF 5% COG 4 1 1 B Y N
5 2113928J06 CAP CER CHIP 4.7 UF 10% 10V 1 1 1 B Y N
5 2311049A56 CAP TAN CHIP A/P 4.7 20 10 5 1 1 B Y N
5 2409350L15 IND CER LZRETCH 22 NH 2 1608 2 1 1 B Y N
5 2409646M02 IND CER MULTILYR 4.7NH 1608 2 1 1 B Y N
5 2409646M13 IND CER MULTILYR 39NH 1608 1 1 1 B Y N
5 2409646M68 IN CER MULTILYR 3.3NH 1608 1 1 1 B Y N
5 2409646M76 IN CER MULTILYR 3.9NH 1608 1 1 1 B Y N
5 2409646M77 IN CER MULTILYR 4.7NH 1608 1 1 1 B Y N
5 2409646M78 IN CER MULTILYR 5.6NH 1608 2 1 1 B Y N
5 2409646M85 IN CER MULTILYR 22 NH 1608 1 1 1 B Y N
5 2409646M92 IN CER MULTILYR 2.7NH 1608 1 1 1 B Y N
5 2409646M94 IND CER MULTILYR 47NH 1608 2 1 1 B Y N
5 2462587P36 CHIP IND 100000 NH 1 1 1 B Y N
5 2462587Q03 IND CHIP 82 NH 20% 2 1 1 B Y N
5 2462587Q38 IND CHIP 180 NH 10% 1 1 1 B Y N
5 2609225D01 SHIELD VCO 1 1 1 1 B Y N
5 2609226D01 SHIELD VCO 2 1 1 1 B Y N
5 2609227D01 SHIELD RCVR 1 1 1 B Y N
5 2609228D01 SHIELD GIFSYN 1 1 1 B Y N
5 2609229D01 SHIELD TIC 1 1 1 B Y N
5 2609230D01 SHIELD MODEM 1 1 1 B Y N
5 4009169E01 SW ASSY DET/SMART CARD BLOCK 1 1 1 B Y N
5 4209388S01 CLIP TOP FLEX 4 1 1 B Y N
5 4809118D01 LED BICOLOR LNJ107W5PRA1 1 1 1 B Y N
5 4809277D02 XTAL OSC 13MHZ SMD 1 1 1 B Y N
5 4809527E18 TSTR NPN RF BFP420 1 1 1 B Y N
5 4809527E19 TSTR NPN RF BFG540 SOT-143 1 1 1 B Y N
5 4809527E20 TSTR NPN RF 2SC4784 SC70 2 1 1 B Y N
5 4809579E02 TSTR MOSFET N-CHAN 25K1830 1 1 1 B Y N
5 4809579E07 TSTR MOSFET P-CHAN IRF7004 4 1 1 B Y N
5 4809579E16 TSTR MOSFET N-CHAN TN0200T 1 1 1 B Y N
5 4809579E17 TSTR MOSFET P-CHAN SI9424 4 1 1 B Y N

5 4809579E18 TSTR MOSFET P-CHAN TP0101T 3 1 1 B Y N
5 4809605E02 TSTR SIG NPN 2SC4617 5 1 1 B Y N
5 4809605E06 TSTR SIG NPN AT32011 1 1 1 B Y N
5 4809606E02 DIODE DUAL ARRAY DAN222 1 1 1 B Y N
5 4809606E08 DIODE DUAL SCHOTTKEY RB715F 1 1 1 B Y N
5 4809607E02 TSTR SIG PNP 25A1774 2 1 1 B Y N
5 4809607E04 TSTR SIG PNP 2SB1132 SOT89 1 1 1 B Y N
5 4809607E05 TSTR PNP DTA143EE 2 1 1 B Y N
5 4809608E03 TSTR DIG PNP DTA114YE 1 1 1 B Y N
5 4809612F03 DIODE VCTR SMV1204-14 SOT23 1 1 1 B Y N
5 4809641F02 DIODE VCTR ABRUPT SMD SOD232 1 1 1 B Y N
5 4809641F03 DIODE VCTR ABRUPT SMD SOD323 2 1 1 B Y N
5 4809641F04 DIODE VCTR SMV1204-70 SOT23 1 1 1 B Y N
5 4809788E06 DIODE ZENER 6.8V UDZ6.8B 5 1 1 B Y N
5 4809939C08 TSTR DUAL PNP/PNP UMA6NTL 2 1 1 B Y N
5 4809940E01 TSTR NPN MRF947 A/P 2 1 1 B Y N
5 4809940E04 TSTR NPN RF NE68030 SOT323 2 1 1 B Y N
5 4809948D06 DIODE 1 1 1 B Y N
5 4809948D10 DIODE PIN BAR63-03 1 1 1 B Y N
5 5109522E23 IC SNGL INV GATE TC7SH04FU 1 1 1 B Y N
5 5109522E25 IC SNGL NOR GATE TC7SH02FU 3 1 1 B Y N
5 5109572E04 IC GAAS RF SW DPDT MS098 1 1 1 B Y N
5 5109632D08 IC CUSTOM IMPROVED PAC 1 1 1 B Y N
5 5109632D51 IC CUST BIPOLAR TIC 14SOIC 1 1 1 B Y N
5 5109632D73 IC CUST GIFSYN SILXC7786FB 1 1 1 B Y N
5 5109781E41 IC 2.7V REG TC55RP2702EMB 1 1 1 B Y N
5 5109781E57 IC LIN VOLT DECT 3V PST995MNR 1 1 1 B Y N
5 5109908K06 IC RF PA GAAS 1.5W CLASS 1 1 1 1 B Y N
5 5199281C01 IC MASK DSP MODEM SC390220PBI 1 4 1 B Y N
5 5199281C02 IC MASK DSP MODEM 2.7V 80TQFP 1 1 1 B Y N
5 8409336E01 PCB DCS RAE 1 1 1 B Y N
5 9109068E01 FLTR CER LC BP 1600MHZ SMD 1 1 1 B Y N
5 9109068E02 FLTR CER LC BP 1800MHZ SMD 1 1 1 B Y N
5 9109155K01 FLTR CER RX 1800-1900MHZ SMD 1 1 1 B Y N
5 9109179E01 FLTR SAW PB 215MHZ 150KHZ BW 1 1 1 B Y N
4 5409884J35 BAR CODE LABEL WHITE/BLACK 1 1 1 B Y N